



USSN 10/808,157
Attorney Docket No. 2003-0022-01

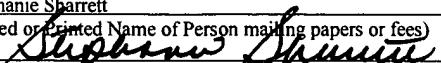
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Richard L. Sandstrom, et al.

Serial No.: 10/808,157

Filing Date: March 23, 2004

Title: DUV LIGHT SOURCE OPTICAL ELEMENT IMPROVEMENTS

Examiner: Unassigned

Group Art Unit: Unassigned

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

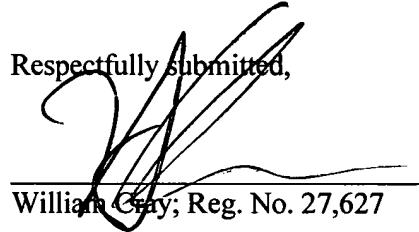
In accordance with 37 C.F.R. § 1.97 and § 1.98, applicants submit for consideration in the above-identified application the attached Form PTO-1449. The Information Disclosure Statement submitted herewith is being filed before the mailing date of the first Office Action on the merits. Copies of the cited references are not provided pursuant to the USPTO waiving the requirement of submitting patent copies for applications filed after June 30, 2003, however Items AI through BO are provided herewith.

It is respectfully requested that the Examiner indicate consideration of the cited references by returning a copy of the attached form PTO-1449 with initials or other appropriate marks.

This Information Disclosure Statement under 37 C.F.R. § 1.97 is not to be construed as a representation that: (i) a complete search has been made; (ii) additional information material to the examination of this application does not exist; (iii) the information, protocols, results and the like reported by third parties are accurate or enabling; or (iv) the above information constitutes prior art to the subject invention.

Accordingly, no fee is believed to be due. The Commissioner is hereby authorized to charge any fees, or to credit any overpayment to Deposit Account No. 03-4060.

Respectfully submitted,



William Gray; Reg. No. 27,627

May 6, 2004
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U.S. Department of Commerce, Patent and Trademark Office		Atty Docket No.	Serial No.
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)		Applicant(s)	
		Richard L. Sandstrom, et al.	
		Filing Date	Group
		March 23, 2004	Unassigned

U.S. Patent Documents

*Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
	A	2,759,106	8/14/56	Hans Wolter	250	53	
	B	3,150,483	5/10/62	Mayfield, et al.	60	35.5	
	C	3,232,046	2/1/66	Rudolf Meyer	50	35.5	
	D	3,279,176	10/18/66	Robert H. Boden	60	202	
	E	3,746,870	7/17/73	Donald M. Demarest	250	227	
	F	3,960,473	6/1/76	Thomas Harris	425	467	
	G	3,961,197	6/1/76	John M. Dawson	250	493	
	H	3,969,628	7/13/76	Roberts, et al.	250	402	
	I	4,042,848	8/16/77	Ja Hyun Lee	313	231.6	
	J	4,088,966	5/9/78	Michael A. Samis	313	231.5	
	K	4,143,275	3/6/79	Mallozzi, et al.	250	503	
	L	4,162,160	7/24/79	Gerald J. Witter	75	246	
	M	4,203,393	5/20/80	Dante S. Giardini	123	30	
-----	N	4,504,964	3/12/85	Cartz, et al.	378	119	
	O	4,536,884	8/20/85	Weiss, et al.	378	119	
	P	4,538,291	8/27/85	Seiichi Iwamatsu	378	119	
	Q	4,596,030	6/17/86	Herziger, et al.	378	119	
	R	4,618,971	10/21/86	Weiss, et al.	378	34	
	S	4,626,193	12/2/86	Ronald A. Gann	431	71	
	T	4,633,492	12/30/86	Weiss, et al.	378	119	
	U	4,635,282	1/6/87	Okada, et al.	378	34	

Foreign Patent Documents

							Translation
		Document	Date	Country	Class	Subclass	Yes
							No

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)

Examiner	Date Considered
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	V	4,751,723	6/14/88	Gupta, et al.	378	119	
	W	4,752,946	6/21/88	Gupta, et al.	378	119	
	X	4,837,794	6/6/89	Riordan, et al.	378	119	
	Y	5,023,897	6/11/91	Neff, et al.	378	122	
	Z	5,027,076	6/25/91	Horsley, et al.	324	674	
	AA	5,102,776	4/7/92	Hammer et al.	430	311	
	BB	5,126,638	6/30/92	Rolf Dethlefsen	315	326	
	CC	5,142,166	8/25/92	Daniel L. Birx	307	419	
	CC	5,313,481	5/17/94	Cook et al.	372	37	
	DD	5,411,224	5/2/95	Dearman, et al.	244	53	
	EE	5,448,580	9/5/95	Birx et al.	372	38	
	FF	5,504,795	4/2/96	Malcolm McGeoch	378	119	
	GG	5,729,562	3/17/98	Birx et al.	372	38	
	HH	5,763,930	6/9/98	William N. Partlo	250	504	
	II	5,866,871	2/2/99	Daniel L. Birx	219	121	
	JJ	5,936,988	8/10/99	Partlo et al.	372	38	
	KK	5,963,616	10/5/99	Silfvast, et al.	378	122	
	LL	6,031,241	2/29/00	Silfvast, et al.	250	504	
	MM	6,039,850	3/21/00	Stephen C. Schulz	204	192.15	
	NN	6,172,324	1/9/01	Daniel L. Birx	219	121.57	

Foreign Patent Documents

Translation

		Document	Date	Country	Class	Subclass	Yes	No

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	OO	6,051,841	4/18/00	William N. Partlo	250	504	
	PP	6,064,072	5/16/00	Partlo, et al.	250	504	
	QQ	6,195,272	2/27/01	Joseph E. Pascente	363	21	
	RR	6,452,199	9/7/02	Partlo, et al.	250	504	
	SS	6,466,365	10/15/02	Maier, et al.			
	TT	6,496,528	12/17/02	Titus, et al.			
	UU	6,566,667	5/20/03	Partlo, et al.	250	504	
	VV	6,566,668	5/20/03	Rauch, et al.	250	504	
	WW	6,576,912	6/10/03	Visser, et al.	250	492.2	
	XX	6,586,757	7/1/03	Melnychuk, et al.	250	504	
	AA	10/608,521	6/26/03	Rafac, et al.			
	AB	2001/0055364	12/27/01	Kandaka, et al.	378	119	
	AC	2002/0100882	8/1/02	Partlo, et al.	250	504	
	AD	2002/0163313	1/9/03	Ness, et al.	315	111.01	
	AE	2002/0168049	11/14/02	Schriever, et al.	378	119	
	AF	2003/0006383	1/9/03	Melnychuk, et al.	250	504	
	AG	2003/0068012	4/10/03	Ahmad, et al	378	119	
	AH	2003/0219056	11/27/03	Yager, et al.	372	57	

Foreign Patent Documents

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		Document	Date	Country	Class	Subclass	Yes
	AI	2,696,285	9/19/97	Japan			x

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AJ	Apruzese, J.P., "X-Ray Laser Research Using Z Pinches," <u>Am. Inst. of Phys.</u> 399-403, (1994).
AK	Bollanti, et al., "Compact Three Electrodes Excimer Laser IANUS for a POPA Optical System," <u>SPIE Proc.</u> (2206)144-153. (1994).
AL	Bollanti, et al., "Ianus, the three-electrode excimer laser," <u>App. Phys. B (Lasers & Optics)</u> 66(4):401-406, (1998).
AM	Choi, et al., "A 10^{13} A/s High Energy Density Micro Discharge Radiation Source," <u>B. Radiation Characteristics</u> , p. 287-290.
AN	Choi, et al., "Fast pulsed hollow cathode capillary discharge device," <u>Rev. of Sci. Instrum.</u> 69(9):3118-3122 (1998).
AO	Fomenkov, et al., "Characterization of a 13.5nm Source for EUV Lithography based on a Dense Plasma Focus and Lithium Emission," Sematech Intl. Workshop on EUV Lithography (Oct. 1999).
AP	Hansson, et al., "Xenon liquid jet laser-plasma source for EUV lithography," <u>Emerging Lithographic Technologies IV, Proc. Of SPIE</u> , Vol. 3997:729-732 (2000).
AQ	Kato, Yasuo, "Electrode Lifetimes in a Plasma Focus Soft X-Ray Source," <u>J. Appl. Phys.</u> (33) Pt. 1, No. 8:4742-4744 (1991).
AR	Kato, et al., "Plasma focus x-ray source for lithography," <u>Am. Vac. Sci. Tech. B.</u> , 6(1): 195-198 (1988).
AS	Lebert, et al., "Soft x-ray emission of laser-produced plasmas using a low-debris cryogenic nitrogen target," <u>J. App. Phys.</u> 84(6):3419-3421 (1998).
AT	Lebert, et al., "A gas discharge based radiation source for EUV-lithography," <u>Intl. Conf. Micro and Nano-Engineering 98</u> (Sept. 22-24. 1998) Leuven, Belgium.
AU	Lebert, et al., "Investigation of pinch plasmas with plasma parameters promising ASE," <u>Inst. Phys. Conf. Ser</u> No. 125: Section 9, pp. 411-415 (1992) Schiersee, Germany.
AV	Lebert, et al., "Comparison of laser produced and gas discharge based EUV sources for different applications," <u>Intl. Conf. Micro- and Nano-Engineering 98</u> (Sept. 22-24, 1998) Leuven, Belgium.
AW	Lee, Ja H., "Production of dense plasmas in hypocycloidal pinch apparatus," <u>The Phys. Of Fluids</u> , 20(2):313-321 (1977).
AX	Lewis, Ciaran L.S., "Status of Collision-Pumped X-ray Lasers," <u>Am Inst. Phys.</u> Pp. 9-16 (1994).
AY	Malmqvist, et al., "Liquid-jet target for laser-plasma soft x-ray generation," <u>Am. Inst. Phys.</u> 67(12):4150-4153 1996)
AZ	Mather, et al., "Stability of the Dense Plasma Focus," <u>Phys. Of Fluids</u> , 12(11):2343-2347 (1969).

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		Document	Date	Country	Class	Subclass	Yes	No
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OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)								
	BA	Mayo, et al., "A magnetized coaxial source facility for the generation of energetic plasma flows," <u>Sci. Technol.</u> Vol. 4:pp.47-55 (1994).						
	BB	Mayo, et al., "Initial Results on high enthalpy plasma generation in a magnetized coaxial source," <u>Fusion Tech</u> Vol. 26:1221-1225 (1994).						
	BC	Nilsen, et al., "Analysis of resonantly photopumped Na-Ne x-ray-laser scheme," <u>Am Phys. Soc.</u> 44(7):4591-4597 (1991).						
	BD	Partlo, et al., "EUV (13.5nm) Light Generation Using a Dense Plasma Focus Device," <u>SPIE Proc. On Emerging Lithographic Technologies III</u> , Vol. 3676, 846-858 (March 1999).						
	BE	Porter, et al., "Demonstration of Population Inversion by Resonant Photopumping in a Neon Gas Cell Irradiated by a Sodium Z Pinch," <u>Phys. Rev. Let.</u> , 68(6):796-799, (Feb. 1992).						
	BF	Price, Robert H., "X-Ray Microscopy using Grazing Incidence Reflection Optics," <u>Am. Inst. Phys.</u> , pp. 189-199, (1981).						
	BG	Qi, et al., "Fluorescence in Mg IX emission at 48.340 Å from Mg pinch plasmas photopumped by Al XI line radiation at 48.338 Å," <u>The Am. Phys. Soc.</u> , 47(3):2253-2263 (March 1993).						
	BH	Scheuer, et al., "A Magnetically-Nozzled, Quasi-Steady, Multimegawatt, Coaxial Plasma Thruster," <u>IEEE: Transactions on Plasma Science</u> . 22(6) (Dec. 1994).						
	BI	Schriever, et al., "Laser-produced lithium plasma as a narrow-band extended ultraviolet radiation source for photoelectron spectroscopy." <u>App. Optics</u> . 37(7):1243-1248. (Mar. 1998).						
	BJ	Schriever, et al., "Narrowband laser produced extreme ultraviolet sources adapted to silicon/molybdenum multilayer optics." <u>J. of App. Phys.</u> . 83(9):4566-4571. (May 1998).						
	BK	Silfvast, et al., "High-power plasma discharge source at 13.5 nm and 11.4 nm for EUV lithography," <u>SPIE</u> , Vol. 3676:272-275, (Mar. 1999).						
	BL	Silfvast, et al., "Lithium hydride capillary discharge creates x-ray plasma at 13.5 nanometers," <u>Laser Focus World</u> , p. 13. (Mar. 1997).						
	BM	Wilhein, et al., "A slit grating spectrograph for quantitative soft x-ray spectroscopy," <u>Am. Inst. Of Phys. Rev. of Sci. Instrum.</u> , 70(3):1694-1699. (Mar. 1999).						
	BN	Wu, et al., "The vacuum Spark and Spherical Pinch X-ray/EUV Point Sources," <u>SPIE, Conf. On Emerging Tech. III</u> Santa Clara, CA Vol. 3676-410-420 (Mar. 1999)						
	BO	Zombeck, M.V., "Astrophysical Observations with High Resolution X-ray Telescope," <u>Am. Inst. Of Phys.</u> , pp. 200-209. (1981).						
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